

**SYSTEMS AND METHODS FOR ENABLING  
COMPUTATION OF CRC'S  
N-BIT AT A TIME**

**Abstract**

5       A general way of performing a Cyclic Redundancy Check  
(CRC) calculation, N-bit at a time, is disclosed. CRC calculation is based on a generator polynomial  $G(x)$  of degree  $d$  so that all results always fit a  $d$ -bit wide Field Check Sequence (FCS). The generator polynomial allows forming a multiplicative cyclic group comprised of  $d$ -bit wide binary vectors. The iterative calculation method assumes that each new N-bit chunk of data bits, picked from the binary string of data bits, is divided, modulo the generator polynomial  $G(x)$ , so that to obtain a  $d$ -bit wide division result while a current value of the  $d$ -bit wide FCS is displaced in the multiplicative cyclic group, of a value corresponding to  $N$ . Then, the  $d$ -bit wide division result and the displaced  $d$ -bit wide FCS are added to become the new current FCS. The above steps are re-executed until no data bits are left thus, getting the final result of the CRC calculation which can be used either for checking or generation of FCS. The method of the invention allows a forward (from MSB - Most Significant Bit) or backward (from LSB - Least Significant Bit) calculation of CRC's. The invention also provides for an automatic generation of the logic necessary to actually carry out the calculations thus, does not assume any particular skill on CRC's when used. It applies, irrespective of the degree of the generator polynomial in use ( $d$ ) and whatever value of  $N$  is picked.